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ABSTRACT

In an attempt to determine the nature and extent of the changes which are occurring in physical geography textbooks at the introductory college level, a number of American texts published between 1960 and 1983 were subjected to a detailed analysis. Books were divided into an early group (publication dates: 1960-70) and late group (publication dates: 1974-83) and considered for length, subject organization and length of coverage, reading level, material covered, and text supplements. Findings indicate that significant changes are occurring in the content and approach taken in introductory physical geography texts. Three trends are especially noteworthy: a major change in emphasis on the subject of human interaction with the physical environment; an increasing tendency to cover weather and climate at very early points in the texts; and an increasing emphasis on interrelating material content of physical geography by using unifying approaches such as systems analysis. While the scope of this study was on the nature of changes that have been made, it is recommended that future studies focus attention on reasons underlying these changes. (LP)

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TRENDS IN INTRODUCTORY PHYSICAL GEOGRAPHY COLLEGE TEXTBOOKS OVER THE PAST TWO DECADES

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Trends in Introductory Physical Geography College Textbooks
Over the Past Two Decades

Background to the Study

It is often observed that changes in the field of human geography occur at a considerably faster pace than they do in physical geography. This is, of course, largely to be expected in view of the basic differences in the subject matter of the two fields. The human geographer must attempt to keep abreast of the consequences of the extremely rapid numerical growth and technological advancement of the earth's human population. The physical geographer is perhaps less hard-pressed in remaining current in his specialty, since the natural forces which shape the physical face of the earth normally operate at a relatively sedate pace. Changes in the field of physical geography occur not so much because of changes in the physical characteristics of the earth, but rather due to advances in our understanding of those physical characteristics and of the processes which control them.

The basic disparity in the pace of change between human and physical geography is apparent even at the introductory textbook level. Textbooks in human geography are soon out of date, and several different approaches to the treatment of the material have recently gained and then lost popularity.[1] The subject content of introductory textbooks in physical geography, conversely, has been considerably more stable. In fact, Melvin Marcus, well known physical geographer and past president of the Association of American Geographers, stated in 1967 his belief that ". . . the subject matter of physical geography today is roughly the same as it was fifty years ago and as it will be fifty years from now" (Marcus 1967, Footnote 19, p. 9).

On the other hand, the nature of the subject matter taught in introductory physical geography courses and included in physical geography textbooks has certainly not remained completely static over the past two decades, as those of us who have taught in this area for an extended period well know. Changes are occurring, even if at a modest rate, because of at least four factors. First, ongoing research continues to provide increased information about our field. Many of these new findings are not appropriate for treatment at the introductory level, but others, such as plate tectonics theory, have become standard inclusions. Secondly, different philosophies of course content, organization, and treatment have become evident in recent years. A good example of this trend has been the adoption by several textbook authors and by many physical geography instructors of a systems approach to provide a unifying theme to their material. A third factor has been changes in student needs and aptitudes. This includes the unfortunate and much publicized declines in the verbal and mathematics skills of a large proportion of the nation's high school graduates. Many textbook authors, in physical geography and undoubtedly all other lower division college subjects, have written textbooks at a more elementary level in an attempt to accommodate these less prepared students. A fourth and final reason for textbook changes is the actual changes in the earth's surface and atmospheric characteristics that continue to occur. Many of the most striking of these changes are brought about by human activities, but some, such as the eruption of Mt. St. Helens, result from purely natural processes.

Purpose and Nature of the Study

In an attempt to determine more precisely the nature and extent of the changes which are occurring in physical geography textbooks at the introductory college level, a number of recent American textbooks were subjected to a detailed analysis. The publication dates of all these books were between 1960 and 1983. After analysis, the books were divided into two groups for comparison. An "earlier" group of seven textbooks was published during the period from 1960-70, and a somewhat larger "later" group of eleven texts was published during the period from 1974-83 (see Figure 1).

The disparity in the size of the two groups of textbooks was caused by an inability to locate a larger number of suitable texts from the decade of the 1960's. It is believed, however, that all suitable textbooks for this period were included, since several 1960's editions of Books in Print were consulted in order to identify candidates for analysis. The availability of a much larger group of textbooks from the 1974-83 period, conversely, necessitated some selectivity, and it is hoped that a degree of randomness was achieved. An effort was made with this group to achieve a balance between textbooks of varying length and sophistication which was representative of their market availability. In two instances, later editions of textbooks used in the 1960-70 group were utilized in the 1974-83 group. In both cases, substantial alterations had occurred between the earlier and later editions.

Several restrictions were placed upon the textbooks which were selected for analysis in order to achieve as great a degree of comparability as practicable. First, all books were authored by American geographers and

were published by American firms. Secondly, all of the selections could be considered as major, or popular, textbooks, and thus to be representative of a significant segment of the contemporary market. Finally, selections were restricted only to texts dealing exclusively with physical geography. Books on environmental science, earth science, or those which combined physical geography with world regional or human geography were thus eliminated from consideration.

Research Findings

The results of the analysis are provided in the following sections, which are topically organized. In each case, the analytical procedure employed is indicated in the text or in a footnote. Tables 1 and 2 outline some of the more important attributes of each textbook.

Length[2]

Only minor differences were noted in the mean lengths of the two groups of textbooks. The 1974-83 group tended to be slightly lengthier, both in numbers of pages and in total words. The 1960-70 group averaged 446 pages in length, with an estimated mean of 152,300 words. The 1974-83 group averaged 489 pages in length, with an estimated mean of 159,700 words. These numbers represent text length only; they do not include the appendices which some of the texts contain. The foregoing figures produce a fairly similar number of words per page for the two groups, the figures being 341 for the 1960-70 group and 327 for the 1974-83 group.

Major Subject Organization and Length of Coverage

All textbooks in introductory physical geography are devoted largely to the treatment of five basic or "core" subjects. These are weather,

climate, biota, soils, and landforms. Sometimes two or more of these subjects are treated together (such as weather and climate or climate, biota, and soils), but more frequently they are dealt with individually. Different textbooks, however, vary considerably in the order in which these subjects are presented. The subject ordering for each of the analyzed textbooks was noted, both to find out what organizational pattern was most popular, and to determine if any significant differences in ordering existed between the two groups of texts.

In the 1960-70 group of textbooks, landforms was most commonly the first core subject to be addressed (see Table 1). Five of the seven textbooks in the group covered this topic first, followed by coverage of weather and climate, and concluding with treatment of biota and soils. A major shift in ordering, however, was noted in the 1974-83 group. Only one of the textbooks in this group covered landforms first (Navarra, 1980). All the others began with a discussion of weather and climate. There was considerable variation in the order of presentation of the subsequent subject; four of the texts proceeded to cover landforms and then biota and soils, whereas five others reversed this order. An increased tendency to combine and interrelate subjects was also noted for the 1974-83 group.

The length of coverage of the core subjects was also determined for each text by counting the number of pages devoted to each subject. Weather and climate page counts were combined, since in several textbooks the point of demarcation between these subjects was almost impossible to determine. In both groups of textbooks, as might be ex-

pected, three core subjects dominated. These were weather/climate and landforms. In the 1960-70 group, means of 136 pages were devoted to weather/climate, 130 pages to landforms, and 30 pages each to biota and soils. The mean proportion in this group of coverage of the five core subjects to total text length was 73 percent. In other words, a mean of 27 percent of these texts were devoted to other subjects such as maps, the oceans, definitions of geography, and so forth.

A slight but seemingly significant shift in emphasis was noted for the 1974-83 group. In this group, means of 136 pages were devoted to weather/climate, 175 pages to landforms, 45 pages to biota, and 34 pages to soils. Thus weather/climate and soils remained relatively constant in their length of coverage, but landforms and biota experienced marked increases in length. In the 1974-83 group, a mean total of 80 percent of the text coverage was devoted to the five core subjects. There was thus both a proportional and an absolute decrease in the extent of treatment of non-core topics.

Reading Level

The concern has often been expressed in recent years that reading levels for college textbooks, especially at the introductory level, are gradually declining. In order to determine if this trend was evident in the two groups of textbooks being analyzed, each text had its reading level estimated by the use of McLaughlin's SMOG formula (McLaughlin 1969). This formula provides a relatively simple method for determining the reading grade that a person must have reached if he or she is to fully comprehend the assessed text.[3]

Somewhat surprisingly, the reading levels of the two groups of textbooks were found to be nearly identical. The 1960-70 group had a mean reading level of 13.6 and the 1974-83 group had a mean of 13.5. Thus, both groups of texts were about where they should be--at the freshman to sophomore reading level. The slight drop of one-tenth of a point between the first and second groups is statistically insignificant. Both groups, furthermore, contained reading levels ranging from 12 to 15. It should be cautioned that the SMOG formula and most other reading level formulas provide only rough approximations, but it was at least evident that no major deterioration in reading levels had occurred between the first and second groups of texts.

Material Coverage

One of the major goals of the study was to answer a number of questions relating to changes in the approaches to the material taken by the various textbook authors, and to determine the frequency and extent of coverage of a number of non-core topics.

As was mentioned earlier, the systems approach has recently been employed by some physical geography textbook authors to stress the interrelationships which exist between the diversity of subjects covered. This raises questions regarding the extent of usage of this approach, whether or not it was used in textbooks of the 1960's, and whether any textbooks employed other unifying themes. A subjective perusal of the texts indicated that all of the entries in the 1960-70 group treated their material in a more or less "standard" or discrete topical fashion, and that no special unifying approaches were evident. This was also true of five members of the 1974-83 group (see Table 2). Five others, however, had adopted the

systems approach to varying degrees. The final textbook (Oliver, 1979) utilized what might be considered a human application theme. This text placed primary emphasis on the human impacts of the subjects covered.

This, in turn, raised a question as to whether, and to what degree, the human emphasis of the textbooks had changed. The assessment of this factor was again essentially subjective in nature, being based on the reading of numerous sections in various parts of the textbooks which took place throughout the analysis. Texts were given a rating of "1" if they were deemed to have little human emphasis, "2" if they contained a moderate human emphasis, and "3" if they had a high human emphasis. A substantial shift toward an increased human emphasis was noted between 1960-70 and the 1974-83 groups of texts, with the former group having a mean of 1.8 and the latter group a mean of 2.5. Not only did the 1974-83 group contain more information about the effects of the earth's surface and atmospheric characteristics on humans and society; they also discussed more extensively the reciprocal influences of humans on such phenomena as climate, vegetation, and soils.

The geographic or locational emphasis was also subjectively assessed for each textbook in order to determine what, if any, differences existed between the two groups. Some textbooks are primarily process oriented and devote only comparatively brief coverage, often by selected examples rather than systematic treatment, to the distributional patterns of the phenomena under discussion. Such texts were considered to have a low geographic emphasis. Other texts provide extensive and systematic coverage of distributional patterns; they were considered to have a high geographic emphasis.

An intermediate emphasis category was also recognized. As before, a value of "1" was assigned to texts considered to have a low geographic emphasis, "2" to those with an intermediate emphasis, and "3" to those with a high emphasis. A modest decline in geographic emphasis was found to have occurred between the 1960-70 and 1974-83 groups of texts, with the former group having a mean value of 2.4 and the latter a mean of 2.1. Some correlation in the latter group between a systems approach emphasis and a weak geographic emphasis was noted. This may to some extent be expected, since the systems approach has a process rather than a distributional orientation.

A pair of related concerns dealt with in the study were the organizational systems utilized by the various texts in analyzing world patterns of climate and soils. The treatment of each of these subjects presents something of a dilemma to many instructors of physical geography, since a thorough analysis of either frequently consumes more class time than can be readily afforded in a busy semester. Several textbook options are available for both subjects. With climate the question is generally whether or not to go with Koppen (or one of several closely related variations), to try a water balance approach (usually Thornthwaite), or to devise one's own system. With soils, the choice for American instructors is generally whether to use the older genetic soil classification system, the newer Comprehensive (Seventh Approximation) system, or to dispense with soil classification systems altogether. Textbooks are available to serve all these options. As indicated by the two groups of textbooks examined, the recent trend has clearly been toward an increasing diversity of ap-

proaches to both subjects. Every one of the 1960-70 group utilized the genetic soil classification and the Koppen climate classification systems. In the 1974-83 group, the emphasis in soils treatment was rather equally divided between the genetic and the Comprehensive systems, with several texts covering both, and two using no system at all (see Table 2). The use of the Koppen climate classification system was still dominant in the 1974-83 group, but water balance systems were also used, either exclusively or in combination with Koppen, by three authors.

The inclusion or omission of several non-core subjects was also noted in order to determine whether significant differences existed between the two groups of texts. All but one of the examined textbooks (Hidore, 1974) contained one or more sections on maps. The emphasis on this subject, however, was found to have declined somewhat between the first and second group of texts, with the 1960-70 group devoting a mean of 33 pages to the subject, while the 1974-83 group devoted a mean of only 21 pages. Remote sensing, conversely, experienced an increase in coverage, with only one textbook in the earlier group (Strahler, 1960) briefly mentioning the subject, while five texts in the later group provided it some coverage.

The subject of economic minerals is one which is generally declining in popularity as a topic to be treated in introductory physical geography. Three of the 1960-70 group dealt with this subject in some detail, while only two of the 11 members of the 1974-83 group covered this material. In both cases in the latter group, this coverage was partial and very brief. On the other hand, a subject which has experienced a dramatic increase in significance and coverage is plate tectonics. None of the earlier group of

texts covered this subject, while every one of the later group did so.

Treatment of the ocean waters and seafloor features displayed little change between the two textbook groups. Only one textbook (Hidore, 1974) provided no coverage of ocean waters, while in both groups a majority treated, although sometimes very briefly, the major seafloor features or provinces.

Finally, the use of the metric system was observed to have made substantial headway from the first to the second group of texts. None of the earlier group gave measurements in metric, while only one of the later group (Gabler, et. al., 1982) did not systematically use metric. Of the later group, nine texts used dual measurements, while one (Marsh and Dozier, 1981) generally used the metric system exclusively.

Text Supplements

All of the illustrations used in each of the analyzed texts were counted in order to identify any recent trends in this important component of physical geography textbooks.[4] Four categories of illustrations were differentiated; these were photographs, graphs and diagrams, tables, and maps. As might be expected, the total mean number of illustrations included in the 1974-83 textbook group (494) considerably exceeded that of the 1960-70 group (393). The proportion of illustrations of the four types remained relatively constant between the two textbook groups. For each, photographs comprised approximately a third, and graphs and diagrams, two-fifths of the total number of illustrations. The mean proportion of tables to total illustrations declined somewhat from the first to the second group (from 9.9 percent to 5.7 percent), while the proportion of maps displayed a corresponding

increase (from 16.4 percent to 19.0 percent).

The presence or absence of chapter supplements such as outlines, summaries, review questions, and suggested readings were also noted. It was generally observed that a higher proportion of the later group of texts utilized these supplements. This was especially true of chapter outlines, which were used by only one book in the 1960-70 group, but by five in the 1974-83 group. The use of glossaries and appendices also significantly expanded. Only two of the earlier group contained a glossary, while eight of the later group did so. Appendices were used by all but two members of each group, but they were generally lengthier and contained a greater number of sections in the later group.

Summary and Conclusions

It can be concluded that significant changes in content and approach are taking place in introductory level textbooks in physical geography. In fact, it may well be that these changes have occurred at a more rapid rate during the past ten to fifteen years than for any comparable earlier timespan. To this writer, it appears that three trends stand out as being especially important. First, there has been a major increase in emphasis on the subject of human interaction with the physical environment. Secondly, there has been an increasing tendency to cover weather and climate at a very early point in physical geography textbooks. This probably represents a growing appreciation of the control which climate exerts on nearly all other components of the physical environment. Finally, an important increase in emphasis on interrelating the material content of physical geography by the use of unifying approaches such as systems analysis was noted. Some textbook parameters, con-

versely, attain significance by their relative stability. These include textbook length and reading level. Many of the recent trends in introductory physical geography textbooks noted in this paper could not have been anticipated fifteen years ago, and instructors of physical geography can only look forward with interest to the changes that succeeding years will bring.

The emphasis in this paper has been on what changes have taken place in introductory physical geography textbooks, rather than on why they have occurred. Obviously, reasons exist for all the observed changes. It is suspected that in some cases they have occurred largely to avoid what might be considered as undue similarity in content or style with textbooks already on the market. In most cases, however, current trends have resulted from evolving concepts on the nature and unity of physical geography, and on the most effective manner of its presentation at the introductory level. Space limitations have not permitted discussions of the reasons for most textbook changes discovered in this study. The understanding and qualitative assessment of these reasons, however, is very important in charting the course which introductory physical geography is to take in the future. It is hoped that subsequent studies will be directed to this subject.

Figure 1

Texts Selected for Analysis

1960-70 Group

Strahler, Arthur N. Physical Geography. 2nd ed. New York: John Wiley & Sons, 1960.

Trewartha, Glenn T.; Arthur H. Robinson; and Edwin H. Hammond. Fundamentals of Physical Geography. New York: McGraw-Hill Book Co., Inc., 1961.

Van Riper, Joseph E. Man's Physical World. New York: McGraw-Hill Book Co., Inc., 1962.

McIntyre, Michael P. Physical Geography. New York: Ronald Press Co., 1966.

Powers, William E. Physical Geography. New York: Appleton-Century-Crofts, 1966.

Kendall, Henry M.; Robert M. Glendinning; and Clifford H. MacFadden. Introduction to Physical Geography. New York: Harcourt, Brace and World, Inc., 1967.

Patton, Clyde P.; Charles S. Alexander; and Fritz L. Kramer. Physical Geography. Belmont, Cal.: Wadsworth Publishing Co., Inc., 1970.

1974-83 Group

Hidore, John J. Physical Geography: Earth Systems. Glenview, Ill.: Scott, Foresman & Co., 1974.

Patton, Clyde P.; Charles S. Alexander; and Fritz L. Kramer. Physical Geography. 2nd ed. North Scituate, Mass.: Duxbury Press, 1974.

Kolars, John F., and John D. Nystuen. Physical Geography: Environment and Man. New York: McGraw-Hill Book Co., Inc., 1975.

Gardner, James S. Physical Geography. New York: Harper's College Press, 1977.

Oliver, John E. Physical Geography: Principles and Applications. North Scituate, Mass.: Duxbury Press, 1979.

Fellows, Donald K. Our Environment: An Introduction to Physical Geography. 2nd ed. New York: John Wiley & Sons, 1980.

Navarra, John G. Contemporary Physical Geography. Philadelphia: Saunders College, 1981.

continued

Marsh, William M., and Jeff Dozier. Landscape: An Introduction to Physical Geography. Reading, Mass.: Addison-Wesley Publishing Co., 1981

Gabler, Robert E., et. al. Essentials of Physical Geography. 2nd ed. New York: Saunders College, 1982.

Oberlander, Theodore M., and Robert A. Muller. Essentials of Physical Geography Today. New York: Random House, 1982.

Strahler, Arthur N., and Alan N. Strahler. Modern Physical Geography. 2nd ed. New York: John Wiley & Sons, 1983.

NOTES

[1]For a recent research article comparing contemporary introductory textbooks in human geography with regard to content orientation, reading level, and assessed quality, the reader is referred to James O. Wheeler and Joann P. Slack, "An Assessment of Recent College Textbooks in Introductory Human and Regional Geography," Journal of Geography 80 (Dec. 1981): 249-54.

[2]The following procedure was employed to estimate the total number of words contained by each of the textbooks: A representative page was chosen and the number of words was counted. Total words for the page were divided by the total number of lines in order to estimate the mean number of words per line for the text. Next, the total number of lines on every 25th page was counted. These, in turn, were averaged to estimate the total mean number of lines per page. Finally, the mean number of words per line, the mean number of lines per page, and the total number of pages of text were multiplied together to determine the estimated number of total words.

[3]The SMOG procedure, which was performed for each of the 18 analyzed textbooks, is as follows: First, count 10 consecutive sentences near the beginning of the text, 10 in the middle, and 10 near the end. Second, in the 30 selected sentences, count every word of three or more syllables. Third, determine the nearest whole square root of the number of polysyllabic words counted. Finally, add 3 to the square root. This gives the reading grade that the student must have reached to fully understand the textbook.

[4]Counts were performed by going through every page of the 18 textbooks. In cases where two or more related illustrations were listed by the author as an entity (for example, diagrams of an area before, during, and after glaciation), they were counted as a unit. On occasion, subjective decisions had to be made as to the most appropriate category for certain illustrations. For example, the boundary between maps and diagrams is rather nebulous, and it was arbitrarily decided to count as maps only depictions of real earth locations.

REFERENCES

Marcus, G. M. 1967. "Introductory Physical Geography in the College Curriculum." Introductory Geography: Viewpoints and Themes. Publication No. 5, Assn. of American Geographers, footnote 18, p. 9.

McLaughlin, G. H. 1969. "SMOG Grading--A New Readability Formula." Journal of Reading, 12:639-46.

Table 1

Textbook	Pages*	Est. Words*	Words* per page	Order of core subjects; length of coverage** Weather	Climate	Biota	Soils	Landforms	SMOG Level
1960-70 group									
Strahler, 1960	498	184,000	369	1	2;127	None	3;22	4;228	13
Trewartha, et.al., 1961	390	107,000	274	2	3;143	4;17	5;25	1;106	15
Van Riper, 1962	568	228,000	401	2	3;130	4;64	5;68	1;112	15
McIntyre, 1966	403	81,000	200	1	2;132	3;46	4;29	5;108	12
Powers, 1966	533	179,000	337	2	3;172	5;16	4;21	1;148	13
Kendall, et.al., 1967	348	118,000	339	2	3;94	5;25	4;22	1;84	12
Patton, et.al., 1970	383	169,000	440	2	3;155	4;20	5;26	1;123	15
Group Mean	446	152,300	341		136	30	30	130	13.6
1974-83 group									
Hidore, 1974	386	118,000	305	1	4-;133	3,4-;63	4-;5	2;143	15
Patton, et.al., 1974	367	200,000	544	1	2;165	4;19	5;26	3;113	14
Kolars & Nystuen, 1975	319	111,000	347	1	2;69	4-;11	4-;11	3;62	12
Gardner, 1977	511	159,000	310	1-	1-;84	2;70	3;46	4;207	12
Oliver, 1979	771	157,000	204	1	2;240	4;69	3;56	5;275	14
Fellows, 1980	464	107,500	232	1	2;117	3;25	4-;18	4-;163	13
Navarra, 1981	523	165,000	315	2	3;114	5;65	4;53	1;198	14
Marsh & Dozier, 1981	583	148,000	254	1	2;134	4;63	3;60	5;227	14
Gabler, et.al., 1982	539	201,000	373	1	4;197	2;36	3;45	5;169	14
Oberlander & Muller, 1982	461	148,000	322	1	2;133	3;30	4;30	5;191	14
Strahler & Strahler, 1983	460	242,000	525	1	2;115	5;41	4;28	3;181	12
Group Mean	489	159,700	327		136	45	34	175	13.5

*Text only
**Length of coverage is in pages. Weather and climate figures are totalled.
A dash after the number representing the order means that it is treated together with one or more of the other core subjects.

Table 2

Textbook	Approach	Human* Emphasis	Locational* Emphasis	Climate System	Soils System	Total Illustrations	Words per Illustration
1960-70 group							
Strahler, 1960	Standard	1	1	Koppen	Genetic	621	369:1
Trewartha, et.al., 1961	Standard	1	3	Koppen	Genetic	394	272:1
Van Riper, 1962	Standard	3	2	Koppen	Genetic	383	595:1
McIntyre, 1965	Standard	1.5	2	Koppen	Genetic	306	265:1
Powers, 1966	Standard	3	3	Koppen	Genetic	434	412:1
Kendall, et.al., 1967	Standard	2	3	Koppen	Genetic	310	381:1
Patton, et.al., 1970	Standard	1	3	Koppen	Genetic	314	538:1
Group Mean		1.8	2.4			395	405:1
1974-83 group							
Hidore, 1974	Some Systems	3	2	None	None	230	513:1
Patton, et.al., 1974	Standard	2	3	Koppen	Genetic & Comprehensive	432	463:1
Kolars & Nystuen, 1975	Systems	3	2	Evapo-trans-piration	Genetic	265	419:1
Gardner, 1977	Standard	3	2.5	Koppen	Genetic & Comprehensive	446	357:1
Oliver, 1979	Human Applications	3	1	Koppen	Comprehensive	637	246:1
Fellows, 1980	Standard	1.5	2	Koppen	Genetic & Comprehensive	356	302:1
Navarra, 1981	Standard	3	3	Koppen	Genetic	665	248:1
Marsh & Dozier, 1981	Systems	1	1	Koppen	Genetic & Comprehensive	575	257:1
Gabler, et.al., 1982	Standard	3	3	Koppen	Genetic & Comprehensive	460	437:1
Oberlander & Muller, 1982	Systems	2	1	Koppen & Thornthwaite	None**	426	347:1
Strahler & Strahler, 1983	Systems	3	3	Koppen & Thornthwaite	Comprehensive	938	258:1
Group Mean		2.5	2.1			494	308.1

*1=low, 2=medium, 3=high
**Genetic soil processes discussed, but world soil distribution not covered.